



## CONTENTS

MOLECULAR POPULATION GENETICS OF SOCIAL INSECTS, <i>Pekka Pamilo, Pia Gertsch, Peter Thorén, Perttu Seppä</i>	1
EVOLUTION OF EUSOCIALITY IN TERMITES, <i>Barbara L. Thorne</i>	27
EVOLUTIONARY GENETICS AND GENETIC VARIATION OF HAPLODIPLOIDS AND X-LINKED GENES, <i>Philip W. Hedrick, Joel D. Parker</i>	55
DISSECTING GLOBAL DIVERSITY PATTERNS: EXAMPLES FROM THE ORDOVICIAN RADIATION, <i>Arnold I. Miller</i>	85
A COMPARISON OF ALTERNATIVE STRATEGIES FOR ESTIMATING GENE FLOW FROM GENETIC MARKERS, <i>Joseph E. Neigel</i>	105
THE EVOLUTION OF MORPHOLOGICAL DIVERSITY, <i>Mike Foote</i>	129
INSECT MOUTHPARTS: ASCERTAINING THE PALEOBIOLOGY OF INSECT FEEDING STRATEGIES, <i>Conrad C. Labandeira</i>	153
HALDANE'S RULE, <i>H. Allen Orr</i>	195
ECHINODERM LARVAE AND PHYLOGENY, <i>Andrew B. Smith</i>	219
PRESERVING THE INFORMATION CONTENT OF SPECIES: GENETIC DIVERSITY, PHYLOGENY, AND CONSERVATION WORTH, <i>R. H. Crozier</i>	243
THEORETICAL AND EMPIRICAL EXAMINATION OF DENSITY-DEPENDENT SELECTION, <i>Laurence D. Mueller</i>	269
TOWARD AN INTEGRATION OF LANDSCAPE AND FOOD WEB ECOLOGY: THE DYNAMICS OF SPATIALLY SUBSIDIZED FOOD WEBS, <i>Gary A. Polis, Wendy B. Anderson, Robert D. Holt</i>	289
SETTLEMENT OF MARINE ORGANISMS IN FLOW, <i>Avigdor Abelson, Mark Denny</i>	317
SPECIES RICHNESS OF PARASITE ASSEMBLAGES: EVOLUTION AND PATTERNS, <i>Robert Poulin</i>	341
HYBRID ORIGINS OF PLANT SPECIES, <i>Loren H. Rieseberg</i>	359
EVOLUTIONARY GENETICS OF LIFE CYCLES, <i>Alexey S. Kondrashov</i>	391

PHYLOGENY ESTIMATION AND HYPOTHESIS TESTING USING MAXIMUM LIKELIHOOD, <i>John P. Huelsenbeck, Keith A. Crandall</i>	437
SPECIES TURNOVER AND THE REGULATION OF TROPHIC STRUCTURE, <i>Mathew A. Leibold, Jonathan M. Chase, Jonathan B. Shurin, Amy L. Downing</i>	467
EXTINCTION VULNERABILITY AND SELECTIVITY: COMBINING ECOLOGICAL AND PALEONTOLOGICAL VIEWS, <i>Michael L. McKinney</i>	495
TREE-GRASS INTERACTIONS IN SAVANNAS, <i>R. J. Scholes, S. R. Archer</i>	517
PLANT COMPETITION UNDERGROUND, <i>Brenda B. Casper, Robert B. Jackson</i>	545
MALE AND FEMALE ALTERNATIVE REPRODUCTIVE BEHAVIORS IN FISHES: A NEW APPROACH USING INTERSEXUAL DYNAMICS, <i>S. A. Henson, R. R. Warner</i>	571
THE ROLE OF HYBRIDIZATION AND INTROGRESSION IN THE DIVERSIFICATION OF ANIMALS, <i>Thomas E. Dowling, Carol L. Secor</i>	593
THE ECOLOGY OF INTERFACES: RIPARIAN ZONES, <i>Robert J. Naiman, Henri Décamps</i>	621
ALLOMETRY FOR SEXUAL SIZE DIMORPHISM: PATTERN AND PROCESS IN THE COEVOLUTION OF BODY SIZE IN MALES AND FEMALES, <i>D. J. Fairbairn</i>	659

## INDEXES

Subject Index	689
Cumulative Index of Contributing Authors	706
Cumulative Index of Chapter Titles	708

# SUBJECT INDEX

## A

- Abelson, A., 317-36  
 Abouheif, E., 664, 667-68, 670  
 Abundance traits  
   extinction vulnerability and, 503-4  
*Abutilon theophrasti*  
   growth of  
     root and shoot competition and, 560  
   population structure of heterogeneity and, 558  
*Acacia karroo*  
   herbaceous production and, 522  
*Acacia senegal*  
   nutrient accumulation below, 529  
*Acacia tortilis*  
   grass removal and, 525  
*Acanthamoeba*  
   polyploidy in, 401  
*Acromyrmex versicolor*  
   pleometrotic associations of queens in  
     relatedness in, 7  
 Adaptive radiations, 134  
 Aerosol filtration theory, 323  
 Aerts, R., 549  
 Age-structure  
   population genetic models with, 273-74  
   population genetic models without, 272-73  
*Agropyron desertorum*  
   resource uptake by, 550  
 Albumin gene  
   aligned DNA sequences of, 452  
*Alces alces*  
   riparian systems and, 634  
 Alder  
   riparian zones and, 643  
 Algal biomass  
   *Daphnia* and, 472-73  
 Algal response factor (ARF), 472, 479  
 Allecudis  
   mouthparts of, 160  
 Allelic frequencies  
   in haplodiploids, 57-58  
 Allometry  
   sexual size dimorphism and, 663-80
- Allomyces*  
   polyploidy in, 401  
 Allopolyploidy, 400, 416, 596, 604  
   animals and, 601  
 Allozyme markers  
   gene flow estimation and, 109-10  
 Allozymes  
   genetic studies of social insects and, 4  
   variations in natural populations, 106  
*Alnus rubra*  
   riparian zones and, 642  
*Alnus rugosa*  
   riparian zones and, 643  
 Alpha diversity trends, 97-98  
 Altschul, S. F., 251  
 Alveolates, 399  
   amphimixis and, 403-4  
   polyploidy in, 401  
*Ambystoma*  
   allele transfer among, 603  
 American oyster  
   gene flow in, 121  
 Amino acid sequencing  
   echinoderm phylogenies and, 220  
 Amitochondriate flagellates, 398  
*Amoeba dubia*  
   DNA amounts in, 248  
 Amoebae, 399  
   polyploidy in, 400  
 Amoeboflagellates, 399  
 Amphibians  
   polyploidy in, 401  
 Amphidiploidy, 416  
 Amphimictic cycles  
   evolution of, 419-22  
 Amphimictic reproduction  
   atypical, 408-9  
 Amphimixis, 396-97  
   apomixis combined, 411-12  
   distribution of, 402-6  
 Anadromous fish  
   as terrestrial prey, 296  
 Anadromy, 297  
 Anderson, E., 366, 594  
 Anderson, W. B., 289-309  
*Andrena jacobii*  
   inbreeding in, 8  
   low relatedness in, 8  
 Andrenid bees  
   low relatedness in, 8
- Anemochory, 626  
 Aneuploidy  
   in eukaryotes, 400  
 Angiosperms  
   allopolyploidy in, 401  
   syngamy in, 406  
*Anilocra multilineata*  
   female alternative reproductive behaviors in, 577  
 Animal diversification, 593-613  
   hybridization and, 598-605  
   introgression and, 605-10  
 Animalia, 400  
   amphimixis and, 406  
   polyploidy in, 401  
 Anisogamy, 410, 420-21  
 Ants  
   colonial sex ratios in, 14  
   continuous populations of  
     genetic structure of, 5  
   female dispersal in, 6  
   founding stage in  
     kin groups and, 7  
   inbreeding in, 63  
   intracolony relatedness in, 11  
   microsatellite markers for, 4  
   multi-nest aggregation in, 9  
   relatedness asymmetry in, 14  
   sex ratios in, 15  
   sexual production in  
     intraspecific parasitism and, 10
- Anurans  
   polyploidy in, 604  
 Aoki, K., 111  
 Aphids  
   eusociality in, 28  
 Apicomplexans  
   reduced zygothase in, 403  
*Apis*  
   patrilines in, 6  
*Apis mellifera*  
   phylogeography in, 19-20  
*Apis mellifera capensis*  
   reproductive dominance in, 13  
 Apomixis, 396  
   amphimixis combined, 411-12  
   facultative, 411, 422  
   obligate, 412, 421  
 Aquatic organisms  
   nourishment for  
     riparian vegetation and, 632  
 Aquatic systems  
   nutrient flow in  
     hydrologic cycle and, 292

- Arachnids  
   haplodiploidy and, 56  
 Archaeognathans  
   mouthpart types of, 157-58  
 Archamoebae, 399  
 Archer, S. R., 517-37  
*Archotermopsis*  
   soldiers in, 30  
*Archotermopsis wroughtoni*, 29  
   colony sizes in, 44  
   soldiers in, 47  
 Arnold, M. L., 369  
*Artemisia* hybrids  
   seed germination rates of, 370  
*Artemisia tridentata*  
   resource uptake by, 550  
 Arthropoda  
   obligate apomixis in, 412  
 Artificial rarity, 504  
 Ascomycetes  
   polyploidy in, 401  
 Asexual reproduction, 596  
 Asteroids  
   bipinnaria of, 220  
   evolution of  
     generation of plating and,  
     234  
   phylogenetic analysis of, 224  
   planktotrophic development in,  
     227  
   series of plates in, 233-34  
   *Xyloplax* derived from, 235  
 Astropectinids  
   planktotrophic development in,  
     227  
*Aucochlorella striata*  
   split sex ratios in, 15  
 Auricularia, 220  
 Australian fruit fly  
   range expansion of  
     extreme temperatures and,  
     597-98  
 Automixis, 407  
 Autopolyploidy, 400  
 Autosomal genes  
   X-linked genes compared,  
     74-76  
 Avery, P. J., 70  
 Avian evolution  
   introgressive hybridization and,  
     598  
 Avise, J. C., 257  
 Avider, 624  
*Azotobacter vinelandii*  
   polyploidy and, 397
- B**  
 Babin, C., 94  
 Bacteria  
   DNA amounts in, 247-48  
   polyploidy and, 397  
   *r*- and *K*-selection in, 278  
 Balanced competition  
   in savannas, 533-34  
*Balanites aegyptiaca*  
   nutrient accumulation below,  
     529  
 Bald cypress  
   seed dispersal and, 625-26  
 Balmford, A., 512  
 Bambach, R. K., 91, 97  
 Barclay, H. J., 280  
 Barker, J. S. F., 256  
 Barth, R. C., 529  
 Barton, N. H., 112, 122  
 Bartz, S. H., 35  
 Bateson, W., 200  
 Beaver  
   riparian systems and, 634, 643  
 Beaver ponds  
   biomass input in, 291  
 Bees  
   annual colonies of, 2  
   cofoundresses in  
     relatedness of, 8  
   eusocial  
     cofoundresses in, 8  
     evolution of helpers in, 38  
   labiomaxillary complex in, 156  
   low relatedness in, 8  
   microsatellite markers for, 4  
   split sex ratios in  
     worker-manipulated, 15  
   workers among, 13  
 Beetles  
   eusociality in, 28  
   haplodiploidy and, 56  
   larval mouthparts of, 156  
   mandibulate condition in, 155  
 Begun, D., 209  
 Belcher, J. W., 556  
 Benthic fauna  
   biomass of  
     overlying waters and, 291  
 Benthic zones  
   detritivore populations in,  
     291-92  
 Benthopectinids  
   planktotrophic development in,  
     227  
 Bernhard-Reversat, F., 529  
 Beta diversity trends, 97-98  
 Biodiversity, 243-61  
   as information content, 244-47  
   preservation of  
     economic theory and, 260  
     statistical sufficiency and,  
     253-54  
   surrogacy and indicator groups  
     and, 254-56  
 Biodiversity preservation  
   species abundance and, 246  
 Biological conservation, 244  
   decision making and, 260-61  
 Biological diversity  
   taxonomic richness and, 130  
 Biological species concept, 361  
 Biomass partitioning  
   trophic structure and, 469-71  
 Biotic homogenization, 512-13  
 Bipinnaria, 220  
 Birch, L. C., 597  
 Bird, A. P., 249  
 Birds  
   foraging  
     nutrient flow and, 293  
   male-biased sexual size  
     dimorphism in, 661  
   riparian zones and, 642-43  
 Bivalves  
   juveniles of  
     projecting appendages of,  
     326  
 Blackburn, T. M., 143, 255  
 Black cottonwood  
   climatic selection pressures and,  
     638  
 Black spruce  
   riparian zones and, 643  
 Blake, D. B., 224, 227  
 Bluegill sunfish  
   male alternative reproductive  
     behaviors in, 573-74  
 Bluehead wrasse  
   female alternative reproductive  
     behaviors in, 576  
   male alternative reproductive  
     behaviors in, 574, 581  
 Body size  
   extinction vulnerability and,  
     502-3  
 Bogart, J. P., 603, 612  
*Bombus sibiricus*  
   conservation worth of, 259  
 Bookstein, F. L., 135  
*Borassus aethiopum*  
   distributions of roots of, 562  
 Bossert, W. H., 272  
*Botrytis cinerea*  
   aneuploidy in, 400  
 Bottjer, D. J., 144  
 Boundaries, 621  
 Bowerbirds  
   genetic diversity in  
     retention of, 259  
 Brachiopods  
   reduction of diversity in,  
     135-36  
   Taconic orogeny and, 95  
   Branch abscission, 626  
 Brett, M. T., 472

- Briggs, J. C., 511  
 Brinson, M. M., 626  
 British Museum of Natural History, 251  
 Brown, J. H., 497, 500, 503, 504, 505  
 Brown, V. K., 296  
 Brown bear  
   riparian zones and, 643  
 Browsing  
   savannas and, 530-31  
 Bryopsida  
   autopolyploidy in, 401  
 Bullini, L., 611  
 Bumblebees  
   conservation worth of, 259  
*Burkea africana*  
   grass removal and, 525  
   herbaceous production and, 521  
*Burkholderia*  
   amphimixis and, 398  
 Buroker, N. E., 121  
 Bushbuck  
   riparian zones and, 643  
 Buth, D. G., 604  
 Butman, C. A., 332, 334
- C**
- Caenorhabditis*  
   male heterogamety in, 199  
 Cahill, J. F., 560  
 Caldwell, M. M., 555, 558, 559  
 Cambrian  
   early increase in disparity in, 137  
   trilobite fauna in, 134  
 Cambrian Explosion, 89, 133  
 Campbell, B. D., 551, 557  
*Cameloma decisum*  
   partheogenesis in  
     evolution of, 602  
*Canidia maltosa*  
   aneuploidy in, 400  
*Canis rufus*  
   hybridization of, 610  
 Cape honeybee  
   reproductive dominance in, 13  
 Carboniferous  
   early increase in disparity in, 137  
*Carex crinita*  
   belowground competition and, 556  
 Carney, H. J., 473  
 Carpenter, S. R., 468-69, 473  
 Casper, B. B., 545-65  
*Castor canadensis*  
   riparian systems and, 634  
 Catadromy, 297  
 Catostomids  
   disomic inheritance in, 604  
*Catostomus discobolus yarrowi*  
   hybrid origin of, 607  
*Catostomus tahoensis*, 605  
 Cavalli-Sforza, L. L., 441  
 Cavener, D. R., 57  
 Cenozoic  
   early increase in disparity in, 137  
   insect mouthparts in, 163  
 Cenozoic extinction, 511  
*Cerceris antipodes*  
   relatedness in, 8  
*Cerion*  
   variation in, 609  
*Cervus canadensis*  
   riparian zones and, 643  
 Chapman, T. W., 64  
 Character diversity  
   predicting, 132  
 Charlesworth, B., 212, 214, 273-74, 368  
 Charophyceae  
   amphimixis and, 405  
   polyploidy in, 401  
 Chase, J. M., 467-87  
*Chasmistes cujus*, 605  
*Chelonia mydas*  
   endangered status of, 258  
 Cheverud, J. M., 674-75, 678  
 Chlorarachniophyta  
   amphimixis and, 404  
 Chlorophyta, 400  
   amphimixis and, 405-6  
 Chloroplast DNA (cpDNA)  
   gene flow estimation and, 114-15  
 Choanoflagellata, 400  
 Chorarachniophyta, 399  
*Chorisia speciosa*  
   flooding and, 625  
 Christiansen, F. B., 274-75  
 Chromosome-linkage hypothesis  
   termite social evolution and, 36  
 Chromosomes, 392  
 Chrysomelids  
   mouthparts of, 160  
 Churchill, L. L., 135  
 Chytridiomycota  
   polyploidy in, 401  
 Cicadelloids  
   mouthparts of, 162  
*Cicindella dorsalis*  
   endangered status of, 258  
*Cicindella puritana*  
   endangered status of, 258  
 Cidaroids  
   metamorphism in, 233  
 Cladistic diversity measure, 251  
 Cladocerans  
   hybridization of, 609  
 Cladogenesis, 626  
 Clegg, M. T., 57  
*Clemmys insculpta*  
   habitat of, 642  
 Clutton-Brock, T. H., 675, 678  
 Coalescent, 111  
 Coalescent models  
   gene flow estimation and, 116  
 Cobitids  
   tetraploids in, 604  
 Cockerham, C. C., 110, 111  
 Cody, M., 272  
 Coelho, M. M., 604  
 Cole, D. W., 635  
 Collares-Pereira, M. J., 604  
 Collobolans  
   entognathous-stylate  
     mouthparts of, 173-75  
   mouthpart types of, 157-58  
 Community convergence  
   in ecomorphology, 135  
 Competition  
   balanced  
     in savannas, 533-34  
   See also Plant competition  
 Condition-dependent fitness  
   alternative reproductive  
     behavior and, 578-79  
 Condra, C., 280  
 Conservation biology, 244  
   extinction proneness and, 496  
   stock concept and, 256-57  
 Consumers  
   movement in food webs, 297-8, 302-3  
 Continent island model, 108, 110  
 Coope, G. R., 511  
 Coprolites  
   fossil insects and, 164-66  
*Coptotermes lacteus*  
   wing bud abscission in, 38  
 Corals  
   larvae of  
     projecting appendages of, 326  
 Correll, D. L., 635  
 Cottonwood  
   good seedling years and, 626  
 Coyne, J. A., 197, 198, 199, 205, 206, 213  
 Cracraft, J., 93  
 Crandall, K. A., 437-62  
*Crassostrea virginica*  
   gene flow in, 121  
*Crepis*  
   autopolyploidy in, 401  
*Crepis tectorum*  
   hybridization experiments with, 371

- Cretaceous  
   early increase in disparity in, 137  
   insect mouthparts in, 160-63  
 Cretaceous extinction, 511  
 Crickets  
   mandibulate condition in, 155  
 Crinoid disparity  
   through Paleozoic, 133-34  
 Crinoids  
   adult body plans of, 235-36  
 Crisp, D. J., 329  
 Crow, J. F., 111  
 Crozier, R. H., 28, 62, 243-61  
 Crump, M. L., 668  
 Cryptophyta, 399  
   amphimixis and, 404  
 Cyclical oligogyny, 18-19  
 Cyclic inbreeding theory  
   terminate social evolution and, 35-36  
 Cyphonautes  
   larvae of  
     locomotion of, 328, 331  
 Cypriniforms  
   allopolyploidy for, 604  
 Cytoplasmic DNA  
   aneuploidy and, 400
- D**
- Dacrycarpus dacrydioides*  
   flooding and, 639  
*Dacrydium cupressinum*  
   flooding and, 639  
*Dacus tryoni*  
   range expansion of  
     extreme temperatures and, 597-98  
 Daly, K., 371  
 Damselfish  
   female alternative reproductive behaviors in, 577  
*Daphnia*  
   effects on algae, 472-73  
*Daphnia pulex*  
   hybridization of, 602  
   parthenogenetic clones of, 602  
*Daphnia pulex*  
   hybridization of, 602  
 Darwin, C., 27, 269-70, 468, 598, 610  
 Data analysis  
   morphological diversification and, 145  
 David, B., 232, 233, 234  
 Decamps, H., 621-48  
 Deer mouse  
   gene flow in, 120  
 Defresne, F., 602  
*Deinococcus radiodurans*  
   polyploidy and, 397  
 DeMarais, B. D., 608  
 Deme, 108  
 Demetrius, L., 271  
 Demographics models  
   gene flow estimation and, 108-9, 113-14  
 Denitrification, 636-37  
 Denny, M., 317-36  
 Density-dependent selection, 269-84  
   empirical research in, 277-84  
   population stability and, 276-77  
   theories of, 271-77  
 Depressions  
   water flow and, 320-22  
 Detritivores  
   plant detritus and, 291-92  
 Detritus  
   movement in food webs, 291-95, 300-1  
 Devonian extinction, 510, 511  
 Diamond, J. M., 498  
 Diatoms  
   amphimixis and, 404  
*Dichentomum*  
   mouthparts of, 158  
 Dictyosteleans  
   amphimixis and, 405  
 Diffusional deposition  
   propagule transport to substrata and, 324  
 Digital elevation model (DEM), 623  
 Dinoflagellates  
   ploidy cycles and, 402  
 Dioecy, 410  
 Diploids  
   haplodiploids compared, 71-74  
 Diplomonads  
   amphimixis and, 402  
 Direct interception  
   propagule transport to substrata and, 323  
 Disparity metrics, 139  
 Dispersal, 107-8  
 Dispersal distance  
   gene flow estimation and, 118-20  
 Dixon, M. T., 447  
 DNA-DNA hybridization  
   echinoderm phylogenies and, 220  
 DNA fingerprinting  
   multilocus  
     parentage and, 4  
 DNA hybridization  
   higher-taxon richness and, 255  
 DNA markers  
   gene flow estimation and, 114-16  
 DNA replication, 393  
   two-step meiosis and, 418  
 DNA substitution models, 445-50  
   testing, 452-56  
 Dobzhansky, T., 195, 200-3, 271, 376, 596  
 Dobzhansky-Muller model, 201-3  
 Dominance theory  
   Haldane's rule and, 203-10  
 Douglas fir  
   riparian zones and, 642  
 Dowling, T. E., 593-613  
 Downing, A. L., 467-87  
*Drosophila*  
   Haldane's rule and, 197-98  
   hybrid sterility in, 202, 205-6  
   population stability in  
     food levels and, 276  
*Drosophila melanogaster*  
   autosomal chromosomes in  
     lethal/semilethal genes in, 69  
   density-dependent selection in, 281-82  
   equilibrium population size in  
     competitive ability and, 278  
   heterozygosity in, 73  
   nucleotide diversity in, 74  
   population growth in  
     male fertility and, 272-73  
   sexual size dimorphism in  
     evolution of, 679  
   wild populations of  
     allozyme-null alleles in, 69-70  
   X chromosome in  
     genetic variation in, 67  
   X-linked genes in, 56  
     maintenance of  
       polymorphism for, 61  
*Drosophila persimilis*  
   autosomal chromosomes in  
     lethal/semilethal genes in, 69  
*Drosophila pseudoobscura*  
   autosomal chromosomes in  
     lethal/semilethal genes in, 69  
   r-selected  
     population growth and, 280  
*Drosophila robusta*  
   X-linked euchromatin in, 56  
*Drosophila simulans*  
   nucleotide diversity in, 74
- E**
- Early Cenomanian Dakota Formation  
   angiosperm-centered  
     pollination syndromes in, 168

- Early Cretaceous  
insect feeding strategies in,  
178-79
- Early Devonian  
insect feeding strategies in,  
173-75
- Early Jurassic  
early increase in disparity in,  
137  
insect feeding strategies in,  
177-78
- Early Permian  
insect feeding strategies in,  
175-77
- Echinoderm larvae, 219-37  
evolution of  
rates and patterns of, 228-32  
life-history studies of, 226-28  
metamorphosis of, 232-37  
morphology of, 225-26
- Echinoderm phylogeny  
constructing  
advances in, 220-25
- Echinoderms  
cladogram of, 223  
class relationships among,  
224-25  
fossil record of, 226-27  
pentamerism and, 236-37
- Echinoids  
adult body plans of, 234-35  
echinopluteus of, 220  
feeding larvae of  
development of, 231-32  
life-history cycles for, 221  
ocular plate rule and, 233-34  
phylogenetic analysis of, 222  
planktotrophic development in,  
226-27
- Echinopluteus, 220
- Echmatocrinus*, 235
- Ecological corridors  
riparian zones as, 631
- Ecological divergence  
homoploid hybrid speciation  
and, 366
- Ecological time  
nonrandom extinction in,  
497-98
- Ecomorphology, 144  
community convergence in, 135  
morphological similarity and,  
131-32
- Ecosystem conservation  
conservation biology and, 244
- Ecosystems  
modern  
habitat fragmentation in, 497
- Ecotones, 621
- Ectocarpus siliculosus*  
ploidy cycles and, 402
- Edwards, A. W. F., 441
- Effective population size  
haplodiploids and, 61-63
- Ehrenfeld, D. W., 496
- Elephant  
riparian zones and, 643
- Eleutherozoa, 237
- Elk  
riparian zones and, 643
- Elton, C., 468
- Elymus*  
hybridization experiments with,  
371
- Elymus glaucus*  
introgression and, 371
- Emmet, R. B., 233
- Endangered Species Act, 257
- Endurer, 624
- Entamoeba*  
ploidy cycles in, 401  
polyploidy in, 400
- Entamoeba histolytica*  
aneuploidy in, 400
- Environment  
modification of  
woody plants and, 527-30
- Eocene extinction  
global cooling and, 503
- Ephemeropterans  
raptorial ectognathate  
mouthparts of, 175
- Epiponinae  
colony cycles in, 18-19
- Equilibrium niche theory, 535
- Erwin, D. H., 136
- Escherichia coli*  
amphimixis and, 398  
genes of  
ancient conserved sequences  
in, 249  
natural populations of  
genetic exchange in, 397-98
- Ethylene  
production of  
anaerobic soil conditions  
and, 625
- Eucaenus*  
mouthparts of, 158
- Eucalyptus camaldulensis*  
groundwater use by, 627
- Euchromatin  
X-linked, 56
- Euechinoids  
adult body plans of, 233
- Eugereon boeckingii*  
mouthparts of, 158
- Euglenozoa, 399
- amphimixis and, 403
- Eukaryotes  
aneuploidy in, 400  
chromosomes of, 392
- DNA amounts in, 247-48  
life cycles in, 398-412  
phylogeny of, 398-400  
polyploidy in, 400-1
- Euploidy  
origin of, 414-15
- Eusociality  
in termites, 27-49  
correlates of, 39-43  
termite ancestors and, 43-48
- Evolutionarily significant units  
(ESUs), 257-59
- Evolutionarily stable strategies  
(ESSs), 578
- Evolutionary genetics  
of haplodiploids and X-linked  
genes, 57-71  
of life cycles, 391-423
- Evolutionary independent  
defined, 595
- Evolutionary models  
morphological diversification  
and, 145
- Evolutionary radiations  
filling of morphological space  
during, 137-39
- Exoneura bicolor*  
cofoundresses in  
relatedness of, 8
- Exotic species  
riparian zones and, 639-40
- Extinction  
nonrandom  
in ecological/geological  
time, 497-98  
selectivity and, 135-36  
successive diversification and,  
136-37
- Extinction filters, 511-12
- Extinction selectivity, 495-513
- Extinction vulnerability  
abundance traits and, 503-4  
body size and, 502-3  
among geographic biotas,  
510-11  
history of, 496-98  
individual traits and, 498-500  
specialization and, 500-2  
among taxa, 505-10  
traits promoting, 498-505
- F**
- Facultative apomixis, 411, 422
- Fairbairn, D. J., 659-82
- Faith, D. P., 252, 258, 260
- Faster-male theory  
Haldane's rule and, 210-12
- Faster-X theory  
Haldane's rule and, 212-15

- Fell, H. B., 225, 229  
 Felsenstein, J., 443, 444, 451  
 Female calling syndrome, 5  
*Fergioladus*  
   insect pollination of, 166-67  
 Ferns  
   polyploidy in, 401  
 Ferris, S. D., 604  
 Filosea, 399  
   amphimixis and, 404  
 Fingerprinting  
   See DNA fingerprinting  
 Fire  
   savannas and, 530-31  
 Fire ants  
   balanced polymorphism in, 60-61  
   haplotype variation in, 5  
   social polymorphism in, 15-16  
 Fischer, A. G., 91  
 Fish  
   alternative reproductive behaviors in, 571-89  
   polyploidy in, 401  
   specialization among extinction proneness and, 500-1  
 Fisher, R. A., 195, 438  
 Fitness  
   condition-dependent alternative reproductive behavior and, 578-79  
   hybrid estimates of, 369-70  
 Fitter, A. H., 551  
 Flagellates, 399  
   amitochondriate, 398  
   Jakobid, 398  
 Fleas  
   haustellate-stylet condition in, 155  
 Flessa, K. W., 511  
 Flies  
   larval mouthparts of, 156  
 Flooding  
   riparian zones and, 639  
 Floodplain ecosystems  
   nutrient flow in, 293  
 Flood tolerance, 624-25  
 Flowering plants  
   homoploid hybrid species in, 378  
 Fluvial geomorphology, 627  
 Focke, W. O., 362  
 Font, W. F., 352-53  
 Food webs, 289-309  
   components of, 290  
   flow and spatial subsidies in, 291-98  
   trophic dynamics and, 298-303  
   keystone predation model and, 485  
   landscape ecology and, 290-91  
   ocean-land interface and, 303-5  
   spatial subsidies in effects of, 305-7  
 Foote, M., 90, 99, 129-46, 502  
 Foraminifera, 399  
   amphimixis and, 403  
   ploidy cycles and, 402  
   polyploidy in, 401  
 Forman, R. T. T., 628  
*Formica*  
   population structures in, 16-18  
*Formica aquilonia*  
   genetic differentiation in, 17  
   matings in, 6  
*Formica exsecta*  
   colonial sex ratios in, 14  
   genetic differentiation in, 17  
*Formica fusca*  
   genetic differentiation in, 17  
*Formica sanguinea*  
   colonial sex ratios in, 15  
   continuous populations of genetic structure of, 5  
   genetic differentiation in, 17  
   intracolony relatedness in, 11  
   sexual production in intraspecific parasitism and, 10  
*Formica transcaucasica*  
   continuous populations of genetic structure of, 5  
   genetic differentiation in, 17  
*Formica truncorum*  
   colonial sex ratios in, 14  
   genetic differentiation in, 17  
 Fortey, R. A., 131  
 Fossil record  
   echinoderms and, 226-27  
   insect mouthparts and, 157-68  
   introgressive origins and, 609  
   macroevolution in, 134  
   nonrandom extinction in, 497-98  
   pollination syndromes and, 166-68  
   study of disparity in, 146  
 Foundress associations  
   social insects and, 7-9  
 Freshwater fish  
   specialization among extinction proneness and, 500-1  
 Freshwater habitat  
   extinction vulnerability and, 510  
 Fretwell, S. D., 486  
 F-statistics  
   gene flow estimation and, 110  
 Fungi, 400  
   amphimixis and, 406  
   polyploidy in, 401
- ## G
- Gadagkar, R., 10  
 Gadgil, M., 272  
 Gamergates, 9  
 Gametes  
   differentiation of, 410  
 Gametophytes, 397  
 Gamobionts, 397  
 Gange, A. C., 296  
 Gartner, C., 361  
*Gasterosteus aculeatus*  
   male alternative reproductive behaviors in, 574  
 Gaston, K. H., 503, 504  
 Gaston, K. J., 143, 255  
 Gaulin, S. J. C., 675  
 Gene exchange  
   interorganismal origin of, 417-19  
 Gene expression  
   noise suppression and, 249  
 Gene flow, 105-123  
   cladistic measure of, 117-18  
   estimating  
     allozyme markers and, 109-10  
     demographics models and, 108-9, 113-14  
     DNA markers and, 114-16  
     genetic models and, 110, 116-17  
     indirect methods of, 107  
     mutation rate and, 121-22  
     parameter estimation and, 110-12, 117-20  
     population size and, 120-21  
     terminology in, 107-8  
     time and, 122-23  
   female  
     mitochondrial DNA and, 257  
 Gene interactions  
   in hybrid speciation, 372-75  
 Gene number  
   information content and, 248-49  
 Genetic clustering  
   rare plant populations and, 258  
 Genetic diversity (GD), 252-53  
   intraspecific  
     hybridization and, 359  
 Genetic drift, 70, 109, 279  
 Genetic hitchhiking, 66  
 Genetic models  
   gene flow estimation and, 110, 116-17

- Genetic polymorphism  
 alternative reproductive  
 behavior and, 580-81
- Genetic relatedness  
 coefficient of, 4  
 kin selection theory and, 3-4
- Genetic variation  
 of haplodiploids and X-linked  
 genes, 71-76  
 neutrality theory and, 70
- Genome, 392  
 alterations in, 394-95  
 exogamous classes of, 420  
 origin of, 414-15  
 uniting  
 assortment of, 409-11
- Genomic information content,  
 247-50
- Genotypic fitness  
 per-capita rates of population  
 growth and, 272
- Genotypic frequencies  
 in haplodiploids, 57-58
- Geographic biotas  
 extinction vulnerability among,  
 510-11
- Geographic information system  
 (GIS), 623
- Geological time  
 nonrandom extinction in,  
 497-98
- Geomorphology  
 fluvial, 627
- Geospiza*  
 hybridization among, 610
- Gerarus*  
 mouthparts of, 158
- Gerassimova, H., 371
- Germplasm  
 molecular genetics and,  
 256
- Gertsch, P., 1-20
- Giardia*  
 polyploidy in, 400
- Gila seminata*  
 hybrid origin of, 608-9
- Gilia*  
 early hybrid generations of  
 viability and fertility of, 369  
 hybridization experiments with,  
 371  
 hybrid lineages in  
 self-pollination and, 375
- Gilia malior*  
 recombinational speciation and,  
 372
- Gilia modocensis*  
 recombinational speciation and,  
 372
- Giraffa camelopardalis*  
 riparian zones and, 643
- Giraffe  
 riparian zones and, 643
- Gittleman, J. L., 501
- Glaucomphyta, 399  
 amphimixis and, 404
- Global biodiversity, 85-100  
 in Ordovician Radiation, 89-91
- Global change  
 underground plant competition  
 and, 564
- Global cooling  
 Eocene extinction and, 503
- Global warming, 497
- Globorotalia*  
 in morphospace, 135
- Glucose-6-PD deficiency  
 malaria and, 61
- Gnetophytes  
 pollinating insects and, 167
- Goldberg, D. E., 546
- Goldman, C. R., 472
- Goldman, N., 448, 451
- Goodfriend, G. A., 609
- Goss, J., 361-62
- Gossypium bickii*  
 evolution of  
 hybridization and, 377
- Gould, S. J., 609
- Grant, B. R., 368, 598, 610
- Grant, P. R., 368, 598, 610
- Grant, V., 360, 365, 367, 380, 594
- Graham, R., 449
- Grasses  
 effect of woody plants on,  
 519-24  
 effect on woody plants, 524-26
- Grass-tree interactions, 517-37
- Grass-woody plant interactions  
 models of, 531-36  
 studies of, 519-27
- Gravitational deposition  
 propagule transport to substrata  
 and, 323-24
- Green algae  
 polyploidy in, 401
- Gregory, P. T., 280
- Grevillea scapigera*, 258
- Grime, J. P., 555
- Gross, K., 557
- Grover, J. P., 485, 486
- Grubb, P. J., 554
- Guano  
 nutrient transport and, 292,  
 300
- Guensberg, T. E., 96
- Guppies  
 male alternative reproductive  
 behaviors in, 575, 584
- Gut contents  
 fossil insects and, 164-66
- Gymnosperms  
 Paleozoic  
 insect pollination of, 68  
 polyploidy and, 401  
 Pynogenesis, 599
- ## H
- Habitat  
 riparian zones and, 641-43
- Habitat availability  
 homoploid hybrid speciation  
 and, 366
- Hairston, N. G. Jr., 468
- Haldane, J. B. S., 196, 197
- Haldane's rule, 195-215  
 causes of, 203-15  
 dominance theory and, 203-10  
 faster-male theory and, 210-12  
 faster-X theory and, 212-15  
 significance of, 199-200  
 strength of, 197-99
- Halictid bees  
 low relatedness in, 8
- Halictus ligatus*  
 workers among, 13
- Halictus marginatus*  
 variation in, 4
- Hamilton, W. D., 3, 35
- Haplodiploids  
 allelic/genotypic frequencies in,  
 57-58  
 diploids compared, 71-74  
 effective population size and,  
 61-63  
 inbreeding depression in, 67-70  
 inbreeding in, 63-65  
 selection in, 58-61  
 X-linked genes and, 55-77
- Haplometrosis, 7, 18
- Haptophyta, 399  
 amphimixis and, 404
- Hardy-Weinberg equilibrium,  
 415-16
- Hare, H., 3
- Harrison, S., 505
- Hart, M. W., 225-26
- Hebert, P. D. N., 602
- Hedrick, P. W., 55-77, 497
- Helianthus*  
 early hybrid generations of  
 viability and fertility of, 369  
 hybrid speciation and, 379-80
- Helianthus annuus*  
 linkage relationships of, 374
- Helianthus anomalus*  
 linkage relationships of, 374  
 synthesized hybrid lineages  
 and, 373
- Helianthus petiolaris*  
 linkage relationships of, 374

- Helicobacter*  
 amphimixis and, 398  
*Helicoidaris erythrogramma*, 220  
*Helicoidaris tuberculata*, 220  
 Heliozoa  
 automixis in, 407  
 Hemipteroids  
 laciniate mouthparts of, 175  
 Hemoglobin  
 interacting loci of, 248–49  
 Henson, S. A., 571–89  
*Heracleum mantegazzianum*  
 riparian zones and, 640  
 Herbaceous production  
 effects of isolated trees on, 520–22  
 tree density and, 522–23  
 tree size and, 522  
 Herbaceous species composition  
 effects of isolated trees on, 520  
 Herbert, W., 362  
 Herbivores  
 heterogeneity among, 472  
 savannas and, 530–31  
 Herbivory  
 riparian zones and, 628, 632–34  
 Heterogamety  
 postzygotic isolation and, 199–200  
 Heterokonts, 399  
 amphimixis and, 404  
 polyploidy in, 401  
 Heterozygosity  
 in social insects, 4  
 Hillis, D. M., 447, 606  
*Hippopotamus amphibius*  
 riparian zones and, 643  
 Historical stability  
 defined, 595  
 Hoffman, M. T., 525  
 Höglund, J., 678  
 Holland, S. M., 95  
 Hollocher, H., 209, 211, 212, 213  
 Holometabolans  
 sericulate mouthparts of, 175  
 Holothurians  
 adult body plans of, 234–35  
 auricularia of, 220  
 life-history cycles for, 221  
 phylogenetic analysis of, 224  
 Holt, R. D., 289–309, 485  
 Homeomorphy, 134  
 Homoplasy  
 echinoderm larval morphology  
 and, 229–32  
 Homoploid hybrid speciation,  
 365–66  
 case studies in, 377–81  
 Homoploid hybrid species  
 biology of, 381–83  
 Homopterans  
 haustellate-stylet condition in,  
 155  
 segmented beak mouthparts of,  
 176  
 Homozygosity  
 zygotid selfing and, 410  
 Honeybees  
 matings in, 6  
 mitochondrial DNA of, 5  
 phylogeography in, 19–20  
 random amplified polymorphic  
 DNA and, 4–5  
 sex determination in, 12  
 workers among, 13  
 Hotchkiss, F. H. C., 228, 231, 236  
 Huelsenbeck, J. P., 437–62  
 Huff, W. D., 89  
 Humphries, C., 254  
 Hutchinson, G. E., 270  
 Hybrid fitness  
 estimates of, 369–70  
 Hybridization, 593–613  
 animal diversification by,  
 598–605  
 defined, 595  
 evolutionary consequences of,  
 359–60  
 interspecific  
 frequency of, 364–65  
 plant evolution and, 594  
 random amplified polymorphic  
 DNA and, 4  
 social insects and, 12  
 species formation and, 362  
 Hybridogenesis, 599  
 Hybrid plant species, 359–85  
 Hybrid speciation  
 gene interactions in, 372–75  
 models for, 365–66  
 simulation studies of, 367–68  
 Hybrid species  
 defined, 360–61  
 homoploid  
 biology of, 381–83  
 natural, 376–81  
 postmating barriers and, 377–80  
 premating barriers and, 380–81  
 rarity of, 611  
 Hybrid taxa  
 defined, 595  
 implications of, 612–13  
 incidence of, 610–12  
 Hydrochory, 625  
 Hydrologic cycle  
 nutrient flow and, 292  
 Hydrozoans  
 larvae of  
 projecting appendages of,  
 326  
*Hyla chrysoscelis*, 604–5  
*Hyla versicolor*, 604–5  
*Hymenaea courbaril*  
 flooding and, 625  
 Hymenopterans  
 eusocial, 3  
 evolution of, 34  
 haplodiploidy and, 56  
 heterozygosity in, 72  
 hybridization and, 12  
 labiomaxillary complex in,  
 156  
 mitochondrial DNA of, 5  
 social life of  
 kin selection and, 3  
 Hypoperilids  
 mouthparts of, 159
- I**
- Imms, A. D., 30  
*Impatiens glandulifera*  
 riparian zones and, 640  
 Inbreeding, 395  
 in ants, 5–6, 63  
 in bees, 8  
 chromosomal rearrangements  
 and, 366  
 haplodiploids and, 63–65  
 in termites, 35–36  
 X-linked genes in, 63–65  
 Inbreeding depression  
 in haplodiploids/X-linked  
 genes, 67–70  
 Inbreeding species  
 adaptive evolution in, 214  
 Inclusive fitness  
 queen-worker conflicts and, 3  
 Indicator groups  
 biodiversity and, 254–56  
 Individual traits  
 extinction vulnerability and,  
 498–500  
 Inertial impaction  
 propagule transport to substrata  
 and, 323  
 Infinite island model  
 gene flow and, 108–9  
 Information content  
 biodiversity as, 244–47  
 genomic, 247–50  
 Insect colonies  
 classification of, 1–2  
 Insect feeding strategies  
 geochronologic history of,  
 171–79  
 Insect mouthparts, 153–80  
 deviations in, 155–57  
 fossil record and, 157–68  
 mapping into fossil-calibrated  
 cladograms, 169–71  
 patterns of, 154–55

- Insects  
   sociogenetics of, 1-20  
   See also Social insects  
 Insect sociality  
   origin of, 1-3  
 Interface ecology, 621-48  
 Interfaces, 621-22  
 Interorganismal gene exchange  
   origin of, 417-19  
 Interphotoreceptor retinoid  
   binding protein (IRBP) gene  
   likelihood ratio test and, 456-57  
 Intersexual dynamics  
   evolution of alternative  
     reproductive behaviors  
     and, 583-89  
 Interspecific hybridization  
   frequency of, 364-65  
 Intertidal zones  
   detritivore populations in,  
     291-92  
 Intragroup conflict  
   termite social evolution and,  
     37-39  
 Intraorganismal recombination,  
   417  
 Intraspecific genetic diversity  
   hybridization and, 359  
 Introgression, 593-613  
   animal diversification by,  
     605-10  
 Introgression experiments  
   faster-X theory and, 212-13  
 Invader, 624  
*Iridomyrmex purpureus*  
   coexistence of unrelated queens  
     in, 9  
   haplotype variation in, 5  
*Iris*  
   hybrid speciation and, 380  
*Iris* hybrids  
   vegetative growth rates of, 370  
 Island biogeography theory, 344  
 Isogamy, 410  
 Iwasa, Y., 274
- J**  
 Jablonski, D., 144, 498, 502, 507,  
   511  
 Jackson, R. B., 545-65, 558  
 Jager, H. I., 485  
 Jakobid flagellates, 398  
 Janies, D. A., 227, 235  
 JC69 model, 446, 454  
 Jehl, J. R., Jr., 668  
 Jernvall, J., 139  
 Johnson, S. G., 602  
*Juniperus pinchotii*  
   herbaceous production and, 521  
*Juniperus virginiana*  
   herbaceous production and, 521  
 Jurassic  
   insect mouthparts in, 159-60
- K**  
 Kadereit, J. W., 250  
 Kalotermitids  
   neotenic reproductives in, 30  
 Karr, J. R., 634  
 Kattan, G. H., 509  
 Keller, C. M. E., 642  
 Kentucky bluegrass  
   sediment transport and, 630  
 Kerner, A., 364, 366, 380  
 Kershaw, M., 503  
 Kertner, A., 362  
 Keystone predation model, 483-86  
 Kin selection theory  
   social insects and, 3-4  
 Kitchell, J. F., 468-69, 473  
 Knobloch, I. W., 364  
 Koehl, M. A. R., 323  
 Köreuter, J., 361  
 Kondrashov, A. S., 391-423  
 Krajewski, C., 252  
 Krill  
   annual migration of, 297  
*K-selection*, 271-72, 501  
   in bacterial populations, 278  
 Kudu  
   riparian zones and, 643  
*Kuengilarva*  
   mouthparts of, 161
- L**  
 Labandeira, C. C., 153-80  
 Labellates  
   mouthparts of, 177  
 Labyrinthulids  
   amphimixis and, 404  
*Laceta*  
   hybrid sterility in, 199  
 Lactate dehydrogenase  
   interacting loci of, 248-49  
 Lacy, R. C., 36  
 Lafay, B., 224  
 Lake eutrophication, 468  
 Lakes  
   biomass input in, 291  
*Lambrologus brichardi*  
   male alternative reproductive  
     behaviors in, 575  
 Laminar flow  
   particle delivery and, 323-24  
 Landscape ecology  
   food web ecology and, 290-91  
*Lasioglossum hemichalceum*  
   low relatedness in, 8  
*Lasius alienus*  
   hybridization and, 12  
*Lasius flavus*  
   multi-nest aggregation in, 9  
*Lasius niger*  
   hybridization and, 12  
   intracolony relatedness in, 11  
*Lasius pallitarsis*  
   founding stage in  
     kin groups and, 7  
 Late Jurassic  
   insect feeding strategies in,  
     178-79  
*Lateromyxa gallica*  
   amphimixis and, 404  
 Late Triassic  
   insect feeding strategies in,  
     177-78  
*Layia*  
   early hybrid generations of  
     viability and fertility of,  
       369  
 Leaf area index (LAI)  
   in savannas, 530  
 Leafcutters  
   matings in, 6  
 Leibold, M. A., 467-87  
 Leinaas, H. P., 36  
*Leishmania*  
   aneuploidy in, 400  
*Lepomis macrochirus*  
   male alternative reproductive  
     behaviors in, 573-74  
*Leptothorax*  
   relatedness and skew in, 10  
*Leptothorax acervorum*  
   coexistence of unrelated queens  
     in, 9  
   female dispersal in, 6  
   sex ratios in, 15  
*Leptothorax ambiguus*  
   continuous populations of  
     genetic structure of, 5  
*Leptothorax longispinosus*  
   intracolony relatedness in, 11  
 Leutenegger, W., 674-75  
 Lewontin, R. C., 109, 112, 271,  
   597  
 Life cycle  
   diversity of  
     general trends in, 412  
   in eukaryotes, 398-412  
   evolutionary genetics of,  
     391-423  
   evolution of, 414-22  
   parameters of, 392-97  
   in prokaryotes, 397-98  
   structure of, 396-97  
 Likelihood principle, 438-41

- Likelihood ratio tests  
   in phylogenetics, 450-61  
 Lindeman, R. L., 468  
 Linnaeus, 361, 362  
 Lipman, D. J., 251  
*Liquidambar styraciflua*  
   underground competition and,  
     560  
 Littoral zones  
   detritivore populations in,  
     291-92  
 Lizards  
   hybrid sterility in, 199  
 Lobosea  
   amphimixis and, 404  
*Lonicera japonica*  
   underground competition and,  
     560  
 Lotz, J. M., 352-53  
 Lowrance, R., 647  
*Loxodonta africana*  
   riparian zones and, 643  
 Luckinbill, L. S., 278  
 Luidiids  
   planktotrophic development in,  
     227  
*Luxilus albeolus*  
   hybrid origin of, 607  
*Luzula*  
   autopolyploidy in, 401  
 Lyell, C., 496  
*Lythrum salicaria*  
   belowground competition and,  
     556
- M**
- MacArthur, R. H., 270, 271-72,  
   344  
 Mace, G. M., 503, 509  
 Macroevolution  
   in fossil record, 134  
   morphological diversity and,  
     145-46  
 Macroinvertebrate communities  
   riparian vegetation and, 641  
 Malaria  
   glucose-6-PD deficiency and,  
     61  
 Male aggregation syndrome, 5  
 Male fertility  
   population growth in *D.*  
     *melanogaster* and, 272-73  
 Male ploidy, 421  
 Mamay, S. H., 167  
 Mammals  
   foraging  
     nutrient flow and, 293  
   male-biased sexual size  
     dimorphism in, 661  
   riparian zones and, 642  
 Management units (MUs), 257  
 Mao, S., 92, 93, 144  
 Marine environment  
   planar substrata in, 319  
   water flow in  
     depressions and, 320-22  
     protruding bodies and,  
       319-20  
 Marine propagules  
   attachment devices of, 326-28  
   motility of, 323  
   settlement of  
     water flow and, 317-36  
   transport to substrata  
     mechanisms of, 323-25  
 Martin, R. E., 89  
*Mastotermes darwiniensis*, 29  
   developmental options in, 31  
   life span of reproductives in, 42  
 Mating  
   social insects and, 5-7  
 Mating systems  
   interspecific variation in, 571  
 Mating types, 395, 410  
 Maximum likelihood method,  
   438-41  
   phylogenetics and, 441-45  
 May, R. M., 251, 252  
 Mayflies  
   larval mouthparts of, 156  
 Mayr, E., 361, 596-97  
 Mazumder, A., 472  
 McArdle, B. H., 504  
 McCarthy, E. M., 367, 369  
 McCauley, E., 472  
 McClain, M. E., 633-34  
 McDowell, W. H., 637  
 McEdward, L. R., 227, 235  
 McGhee, G. R., Jr., 135  
 McKerrow, W. S., 87  
 McKinney, M. L., 495-513  
 McPeck, M. A., 486  
 McQueen, D. J., 473  
 Meagher, S., 607  
 Mean square error (MSE), 440  
 Meat ant  
   haplotype variation in, 5  
*Meganura monyi*  
   raptorial mouthparts of, 158  
 Megasecopterans  
   mouthparts of, 158  
 Meiosis  
   one-step, 408  
   polyploidy and, 394  
   two-step, 418  
*Membranipora membranacea*  
   larvae of  
     locomotion of, 328, 331  
 Mendel, G., 362  
 Menzel, B. W., 607
- Mesozoic extinction, 510  
*Messor aciculatus*  
   inbreeding in, 5  
 Metamonada, 398  
   amphimixis and, 402  
 Metapopulation, 108  
 Metapopulation dynamics  
   rare species and, 504  
 Metapopulation models  
   gene flow estimation and, 113  
 Microclimate  
   riparian forests and, 631  
   tree leaf area and, 530  
 Microsatellites, 4  
   variation in haplodiploids,  
     73-74  
 Microsporidia, 398  
   amphimixis and, 402  
 Migration, 107-8  
 Miller, A. L., 85-100, 144  
*Mimosa nigra*  
   riparian zones and, 640  
 Minisatellites, 4  
*Mischocyttarus*  
   cofoundresses in  
     relatedness of, 8  
*Mischocyttarus immarginatus*  
   colony cycles in, 18  
 Mites  
   haplodiploidy and, 56  
 Mitochondrial DNA (mtDNA)  
   female gene flow and, 257  
   gene flow estimation and, 114  
   hymenopterans and, 5  
 Mitochondrial DNA (mtDNA) tree  
   population tree and, 258  
 Mitotic recombination, 394-95  
 Molecular genetics  
   germplasm and, 256  
 Molecular markers  
   hybrid taxa and, 376  
 Molecules  
   phenotypes and, 250  
*Molinia caerulea*  
   resource uptake by, 549  
 Monoccy, 410  
 Monophyly, 456-57  
 Mooi, R., 232, 233, 234, 237  
 Moose  
   riparian systems and, 634, 643  
 Mordellids  
   mouthparts of, 160  
 Moritz, C., 257, 258, 601  
 Morphological diversification  
   evolutionary models and, 145  
   geographic context of, 144-45  
   taxonomic diversification and,  
     136-37  
 Morphological diversity  
   complexity of organisms and,  
     133

evolution of, 129-46  
 indirect measures of, 130-31  
 macroevolution and, 145-46  
 in Ordovician Radiation, 98-99  
 radiation of major clades and, 137-39  
 sampling and preservation of, 143-44  
 study of  
     broadening taxonomic scope of, 141-42  
     in systematic biology, 129-30  
     temporal patterns of incompleteness and, 140-41  
 Morphological plasticity  
     plants and, 550-51  
 Morphological similarity  
     ecomorphology and, 131-32  
 Morphological space  
     comparing fullness of, 142-43  
     filling during evolutionary radiations, 137-39  
     patterning in, 134-35  
 Morphotypes, 131  
 Mosquitoes  
     selected for rapid development, 279  
 Mueller, L. D., 269-84  
 Muller, H. J., 200-8  
 Müller, J., 219  
 Mullineaux, L. S., 334  
 Multicellularity  
     origin of, 419  
 Müntzing, A., 362  
 Murray, B. G., Jr., 668  
 Mutation rate  
     gene flow estimation and, 121-22  
 Mycetozoa, 399  
     amphimixis and, 405  
*Mycoplasma genitalium*  
     DNA amounts in, 248  
 Mycorrhizae  
     belowground competition and, 563  
*Myrmica punctiventris*  
     continuous populations of  
         genetic structure of, 5  
*Myrmica tahoenis*  
     coexistence of unrelated queens  
         in, 9  
     relatedness and skew in, 10  
     relatedness asymmetry in, 14

## N

Naiman, R. J., 621-48  
 Naked mole rats  
     eusociality in, 28  
 Nalepa, C. A., 36-37

Nanson, G. C., 630  
 Nascetti, G., 611  
 Naudin, C., 362  
 Nee, S., 199  
 Nei, M., 111  
 Neigel, J. E., 105-123  
 Neighborhood size  
     gene flow estimation and, 118  
 Neighbor Joining, 254  
*Neisseria*  
     amphimixis and, 398  
 Neotenic reproductives, 30  
 Neutrality theory  
     genetic variation and, 70-71  
 Neyman, J., 441  
 Niche  
     *n*-dimensional, 270  
 Niche-breadth hypothesis, 500, 504  
 Niche separation  
     in savannas, 531-33  
 Nicholson, A. J., 277  
 Nicoletto, P. F., 503  
*Nicotiana*  
     hybridization experiments with, 371  
     hybrid lineages in  
         self-pollination and, 375  
         interspecific hybridization and, 371  
 Nixon, K. C., 251  
*Noctiluca*  
     unreduced zygothase in, 403  
 Noise suppression  
     gene expression and, 249  
 Nourishment  
     riparian vegetation and, 632-34  
 Nuclear DNA (nDNA)  
     gene flow estimation and, 115-16  
 Nucleotides  
     pair-bonded  
         non-independent substitution  
             among, 447-48  
 Null distributions, 460-61  
 Nutrient filtration  
     riparian zones as, 634-41  
 Nutrients  
     movement in food webs,  
         291-95, 299-300  
*Nyssa aquatica*  
     seed dispersal and, 625-26, 632

## O

Oakes, E. J., 678  
 Oak savannas  
     herbaceous production and,  
         521  
 Obligate apomixis, 412, 421

Ocellated wrasse  
     male reproductive behaviors in,  
         571-72  
*Ocimum basilicum*  
     rooting densities of, 559  
 O'Connell, N., 117  
 Ocular plate rule  
     nonaxial skeletal elements and,  
         233-34  
 Ocular plate rule, 232  
*Odocoileus virginianus*  
     riparian zones and, 642  
 Ogura, C., 227  
 Oksanen, L., 486  
 Oldroyd, B. P., 13  
 Oligogyny  
     cyclical, 18-19  
 Oogamy, 410  
 Oomycota  
     amphimixis and, 404  
     obligate apomixis in, 412  
     polyploidy in, 401  
 Ophiopluteus, 220  
 Ophiuroids  
     life-history cycles for, 221  
     nonplanktotrophic development  
         in, 228  
     ophiopluteus of, 220  
     phylogenetic analysis of, 224  
     series of plates in, 233-34  
 Ordovician  
     early increase in disparity in,  
         137  
     taxonomic diversity in  
         global patterns of, 144-45  
 Ordovician Radiation, 85-100  
     beta diversity in, 97-98  
     clustering in, 134-35  
     geochemistry and nutrient  
         levels in, 89  
     global biodiversity trends in,  
         89-91  
     intracontinental level in, 94-97  
     morphological diversity in, 99  
     paleocontinents in  
         comparisons among, 91-93  
         positions of, 87-88  
     sea level in, 88  
     tectonic activity in, 88-89  
 Organelar genomes  
     gene flow estimation and, 117  
 Organelle inheritance, 409  
     uniparental, 421  
 Organisms, 392  
     reproduction of, 393  
 Orogeny  
     during Ordovician Radiation,  
         88-89  
 Orr, H. A., 195-215  
 Orthopterans  
     mouthparts of, 159

- Oryza* hybrids  
vegetative growth rates of, 370
- Outbreeding  
in termites, 35–36
- Outcrossing  
evolution of, 422
- Owens, R. M., 131
- P**
- Paleocontinents  
comparisons among, 93–94  
positions of, 87–88
- Paleodictyopterans  
mouthparts of, 158
- Paleozoic  
crinoid disparity through, 133–34  
early increase in disparity in, 137–38  
gymnospermous plants in  
insect pollination of, 68  
insect mouthparts in, 157–59
- Pamilo, P., 1–20, 251
- Panmixia, 395
- Pantazidis, A. C., 202
- Parabasalia, 398  
amphimixis and, 403
- Parachartergus colobopterus*  
cyclical oligogyny in, 19
- Parametric bootstrapping, 460–61
- Parasite assemblages, 341–54  
hierarchy of, 342–43
- Parasite faunas  
component communities of  
richness of, 347–50  
evolution and richness of, 343–47  
infracommunities of  
richness of, 350–54
- Parasites  
antigen-coding gene variation in, 402
- Parasitism  
intraspecific  
sexual production in ants and, 10
- Parentage  
multilocus DNA fingerprinting and, 4  
random amplified polymorphic DNA and, 4
- Parker, J. D., 55–77
- Parsimony analysis, 450
- Parthenogenesis, 599
- Parzkowsky, M. E., 95
- Peacock wrasse  
female alternative reproductive behaviors in, 577, 584
- Pelagic-benthic coupling, 291
- Pelagic group spawning, 571
- Pelomyxa*  
ploidy cycles in, 401
- Pennington, J. T., 231
- Pennsylvanian  
insect feeding strategies in, 175
- Pentamery  
adult echinoderms and, 236–37
- Percolozoa, 399  
amphimixis and, 403
- Perdita texana*  
low relatedness in, 8
- Permian extinction, 511
- Permocicada*  
mouthparts, 159
- Peromyscus maniculatus*  
gene flow in, 120
- Peterjohn, W. T., 635
- Pettigrew hypothesis, 456–57
- Phacocoelus aethiopicus*  
riparian zones and, 643
- Phaeophyta  
amphimixis and, 404  
obligate apomixis in, 412
- Phanerozoic diversification  
kinetics of, 91–93
- Phenotypes  
molecules and, 250
- Phenotypic differentiation  
density-dependent selection and, 272
- Phenotypic plasticity  
alternative reproductive behavior and, 580–81
- Phosphorus  
algal biomass and, 473
- Phosphorus dynamics  
riparian zones and, 635
- Phreatamoeba*  
ploidy cycles in, 401
- PHYLIP, 254
- Phylogenetic analysis  
echinoderms and, 220–25  
parasite assemblages and, 346–47
- Phylogenetic diversity (PD), 252–53
- Phylogenetics, 437–62  
likelihood ratio tests in, 450–61  
maximum likelihood and, 441–45  
Poisson process models and, 445–50
- Phylogenetic trees  
comparison of, 457–60
- Phylogeny  
breeding and, 256  
conservation priorities and, 251  
of eukaryotes, 398–400
- Phylogeography, 119
- Physarum*  
polyploidy in, 401
- Physarum polycephalum*  
aneuploidy in, 400  
ploidy cycles and, 402
- Physiological plasticity  
plants and, 550–51
- Phytoplankton  
grazers and, 472
- Pianka, E. R., 272
- Picea glauca*  
riparian zones and, 643
- Picea sitchensis*  
disturbance regimes and, 624
- Pimm, S. L., 504
- Pinay, G., 637
- Pinus*  
hybrid speciation and, 380–81
- Pinus menziesii*  
underground plant competition and, 562
- Planar substrata  
in marine environment, 319
- Plantago*  
autopolyploidy in, 401
- Plant communities  
riparian  
species in, 624
- Plant competition  
underground, 545–65  
competition for water and, 53  
definition of, 546–47  
global change and, 564  
measurements of, 553–55  
mechanisms of, 548  
resource uptake and, 548  
root gaps and, 562  
soil environment and, 555–59  
symmetry of, 560–61  
traits related to, 549–53
- Plant damage  
insect-mediated  
fossil record of, 163–64
- Plant detritus  
detritivore populations and, 291–92
- Plant evolution  
hybridization and, 594
- Plants  
flood tolerance and, 624–25  
morphological/physiological plasticity and, 550–51
- Plant species  
hybrid, 359–85
- Plasmodiophorids  
amphimixis and, 404
- Plasmodium falciparum*  
antigen-coding gene variation in, 402

Plasticity  
 morphological/physiological  
 plants and, 550-51  
 phenotypic  
 alternative reproductive  
 behavior and, 580-81  
 Pleistocene extinction  
 mammal species and, 503  
 Pleometrosis, 7  
 Ploidy, 392-93  
 evolution of, 415-16  
 increase of, 393-94  
 atypical amphimictic, 407  
 reduction of, 394  
 atypical amphimictic, 407-8  
 Ploidy cycles, 401-2  
*Pneumocystis carinii*  
 antigen-coding gene variation  
 in, 402  
*Poa pratensis*  
 sediment transport and, 630  
*Podosphaera*  
 evolution of  
 generation of plating and,  
 234  
*Poecilia formosa*  
 incomplete syngamy in, 407  
*Poecilia reticulata*  
 male alternative reproductive  
 behaviors in, 575  
*Poecilopsis*  
 hybridization of, 602  
 Poisson process models  
 in phylogenetics, 445-50  
 Polis, G. A., 289-309  
*Polistes*  
 cofoundresses in  
 relatedness of, 8  
*Polistes exclamans*  
 colony cycles in, 18  
*Polistinae*  
 colony cycles in, 18-19  
 Pollination  
 of Paleozoic gymnosperms, 68  
 Pollination syndromes  
 fossil record and, 166-68  
 Pollution  
 riparian zones and, 645-46  
 Polyandry  
 social insects and, 6-7  
*Polybia exigua*  
 cyclical oligogyny in, 19  
*Polybia occidentalis*  
 cyclical oligogyny in, 19  
 Polychaetes  
 larvae of  
 projecting appendages of,  
 326  
 Polygyny  
 social insects and, 7-10  
 Polymerase chain reaction (PCR)

random amplified polymorphic  
 DNA and, 5  
 Polyploidization, 597  
 Polyploidy  
 bacteria and, 397  
 in eukaryotes, 400-1  
 meiosis and, 394  
*Polyrhacis moesta*  
 DNA minisatellites in  
 band-sharing of, 7  
 Ponerine ants  
 reproduction in, 9  
 Poplar  
 nitrogen uptake by, 635  
 Population, 108  
 Population genetic models  
 without age-structure, 272-73  
 with age-structure, 273-74  
 general vs. specific, 274-76  
 Population size  
 gene flow estimation and,  
 120-21  
 Population stability  
 density-dependent selection  
 and, 276-77  
 Population tree  
 mitochondrial DNA tree and,  
 258  
 Population vulnerability, 504-5  
*Populus augustifolia*  
 good seedling years and, 626  
*Populus tremuloides*  
 riparian zones and, 643  
*Populus trichocarpa*  
 climatic selection pressures and,  
 638  
*Populus x canadensis*  
 nitrate filtration and, 637  
 Postzygotic isolation  
 genetics of, 200-3  
 heterogamety and, 199-200  
 Poulin, R., 341-54  
 Prach, K., 640  
 Prey  
 movement in food webs,  
 295-97, 301-2  
 Preziosi, R. F., 664, 679  
 Primates  
 mutation rates in, 70  
 Productivity gradients  
 underground plant competition  
 and, 555-57  
 Prokaryotes  
 chromosomes of, 392  
 life cycles in, 397-98  
 nonreciprocal homologous  
 intergenomic  
 recombination in, 395  
 Protodonatan predators  
 raptorial mouthparts of, 158,  
 175

*Protopolybia emaciata*  
 cyclical oligogyny in, 19  
 Proturans  
 entognathous-stylyte  
 mouthparts of, 173-75  
 Prout, T., 274-75  
*Prumnopitys ferruginea*  
 flooding and, 639  
 Pseudergates, 31  
*Pseudoroegneria spicata*  
 resource uptake by, 550  
*Pseudotsuga menziesii*  
 riparian zones and, 642  
 Psocoptera  
 mortar-and-pestle mouthpart  
 class of, 175  
 Ptacek, M. B., 605  
*Pteraster tessellatus*  
 planktonic dispersal in, 228  
 Pysek, P., 640

## Q

Quantitative trait loci (QTL), 385  
*Quercus douglasii*  
 herbaceous production and, 521

## R

Radiolarians  
 ploidy cycles and, 402  
 polyploidy in, 401  
 Random amplified polymorphic  
 DNA (RAPD)  
 social insects and, 4-5  
 Random walk model, 119-20  
 Raphidophytes  
 ploidy cycles and, 402  
 Rapoport, E. H., 508  
 Rarity  
 extinction likelihood and, 503-4  
 hybrid species and, 611  
 Raup, D. M., 89, 497  
 Read, A., 199  
 Recombinational speciation  
 experimental verification of,  
 370-72  
 initial stages of  
 chromosomal model for, 363  
 Red alder  
 riparian zones and, 642  
 Red algae  
 ploidy cycles and, 402  
 Red wolf  
 hybridization of, 610  
 Reeve, J. P., 679  
 Reif, W.-E., 141-42  
 Reiss, M. J., 678  
 Rensch, B., 672, 680

- Rensch's rule, 666-71, 680-81  
 Reproductive behaviors  
   alternative  
     evolution of, 583-89  
     female, 575-77  
     fish and, 571-78  
     genetic basis of, 580-81  
     male, 573-75  
     mechanisms for maintenance of, 577-80  
     patterns of expression of, 581-83  
 Reproductive systems  
   all-female, 599  
 Reptiles  
   polyploidy in, 401  
 Resister, 624  
 Retortamonads  
   amphimixis and, 402  
*Reynoutria japonica*  
   riparian zones and, 640  
*Reynoutria sachalinensis*  
   riparian zones and, 640  
*Rhizobium*  
   amphimixis and, 398  
*Rhododendron intermedium*  
   hybrid origin of, 364  
   hybrid speciation and, 380  
 Rhodophyta, 400  
   amphimixis and, 405  
   obligate apomixis in, 412  
*Rhytidoponera chalybea*  
   reproduction in, 9  
 Richey, J. E., 633-34  
 Rieseberg, L. H., 359-85  
 Riparian zones, 621-48  
   defining and delineating, 622-23  
   as ecological corridors, 632  
   ecological functions of, 632-43  
   habitat and, 641-43  
   human alterations and, 643-45  
   life-history strategies of, 623-26  
   management and restoration of, 645-47  
   as nutrient filters, 634-41  
   physical functions of, 630-32  
   successional and vegetative patterns in, 626-29  
   woody debris in, 630-31  
 "River continuum concept", 290  
 River red gum  
   groundwater use by, 627  
*Rivulus marmoratus*  
   selfing in, 411  
*r-K* paradigm, 501  
 Rodents  
   mutation rates in, 70  
 Roisin, Y., 37-38  
 Root competition  
   interactions between shoot competition and, 559-60, 563-64  
   productivity gradients and, 555-57  
 Root exclusion tubes, 553-54  
 Root gaps  
   underground plant competition and, 562  
 Root surface area  
   resource uptake and, 549-50  
 Rostrate psocopteran  
   mouthparts of, 158  
 Rotifers  
   haplodiploidy and, 56  
 Roughgarden, J., 272, 274  
 Rowe, F. W. E., 235  
 Royama, T., 277  
*r*-selection, 271-72  
   in bacterial populations, 278  
 Rubenstein, D. I., 323  
 Russell, G. J., 509
- S**
- Saccharomyces cerevisiae*  
   mating-type switching in, 402  
 Sailer, L. D., 675  
 Salamanders  
   male heterogamety in, 199  
*Salix*  
   flooding and, 639  
*Salix scouleriana*  
   disturbance regimes and, 624  
*Salix stichensis*  
   disturbance regimes and, 624  
 Salmon  
   male alternative reproductive behaviors in, 574-75  
   specialist parasites of, 349  
   terrestrial prey of, 295  
 Sanchez, T. M., 94  
 Santana Formation  
   insect fauna of, 161  
 Sarnelle, O., 472  
*Sauropthirus*  
   mouthparts of, 161  
 Savannas  
   balanced competition in, 533-34  
   herbivores and fire and, 530-31  
   humans in, 519  
   niche separation in, 531-33  
   tree-grass interactions in, 517-37  
   tree leaf area index in, 530  
   water and, 527-28  
 Sawflies  
   mandibulate condition in, 155
- Saxifraga*  
   autopolyploidy in, 401  
*Schedorhinotermes lamanianus*  
   kin-based behavior in, 12  
 Schimper, A. F. W., 531  
*Schizachyrium scoparium*  
   zone of nutrient uptake for, 561  
 Schlosser, I. J., 634  
 Schneider, R. L., 632  
 Scholes, R. J., 517-37  
 Schöninger, M., 448  
 Schwinning, S., 561  
*Schyzolobium parahyba*  
   flooding and, 625  
 Scotese, C. R., 87  
 Scouler's willow  
   disturbance regimes and, 624  
 Sea anemones  
   larvae of  
     projecting appendages of, 326  
 Seabirds  
   nutrient transport and, 292, 294, 304  
*Sebastiana klotzchiana*  
   flooding and, 625  
 Secondary sexual characters  
   allometric growth of, 672  
 Secor, C. L., 593-613  
 Sediment load  
   water flow and, 331-32  
 Sediment transport  
   riparian vegetation and, 630  
 Seed dispersal  
   riparian plants and, 625-26  
 Selection  
   in haplodiploids, 58-61  
   See also Density-dependent selection  
   Selfing, 395, 410-11  
 Sepkoski, J. J., Jr., 89, 90, 91, 97  
 Seppä, P., 1-20  
 Settlement, 317-36  
   active vs. passive behavior in, 332-33  
   in environments of different flow conditions  
   ecological significance of, 333-34  
 Sex chromosomes  
   heterozygous  
     degeneration of, 421  
 Sexes, 395, 410  
 Sexual dimorphism, 420-21  
 Sexual size dimorphism (SSD), 659-82  
   allometry for  
     empirical evidence for, 666-71  
     estimating, 663-66

- evolution of, 671-80
  - quantitative evidence for, 662-63
- Sharitz, R. R., 632
- Shift-in-dependent-care hypothesis
  - termite social evolution and, 36-37
- Shine, R., 675
- Shireff, P., 362
- Shite, r., 668
- Shoot competition
  - interactions between root competition and, 559-60, 563-64
- Short, L. L., 598
- Shrimp
  - eusociality in, 28
- Shurin, J. B., 467-87
- Simpson, G. G., 496, 506
- Sitanion hystrix*
  - introgression and, 371
- Sitanion jubatum*
  - introgression and, 371
- Sitka spruce
  - disturbance regimes and, 624
- Sitka willow
  - disturbance regimes and, 624
- Sivapithecus*, 250
- Skeleton Space, 141-42
- Slatkin, M., 110, 112, 117
- Slobodkin, L. B., 468
- Smith, A. B., 219-37
- Smith, F. E., 468
- Smith, G. R., 604, 607
- Smith, H. H., 371
- Snails
  - juveniles of projecting appendages of, 326
- Snaydon, R. W., 558
- Snyder, L. A., 371
- Social evolution
  - in termites hypotheses on, 33-39
- Social insects
  - colony cycles in, 18-19
  - genetic diversity within colonies in, 10-12
  - genetic tools and, 4-5
  - intracolony conflicts and, 3-4
  - kin selection and, 3-4
  - mating and dispersal of, 5-7
  - molecular population genetics of, 1-20
  - polygyny in, 7-10
  - population sex ratios in, 14
  - population structures in, 16-18
  - social polymorphism in, 15-16
  - sociogenetics of, 5-15
  - split sex ratios in, 14-15
  - worker reproduction in, 13
  - workers among selection and, 12-15
- Social polymorphism
  - in fire ants, 15-16
- Sociogenetics
  - of insects, 1-20
- Soil environment
  - underground plant competition and, 555-59
- Soil partitioning
  - underground plant competition and, 552-53
- Soil resources
  - heterogeneity in underground plant competition and, 557-59
- Sokolowski, M. B., 282
- Solenopsis invicta*
  - balanced polymorphism in, 60-61
  - haplotype variation in, 5
  - hybridization and, 12
  - monogynous colonies of brood raiding and, 7
  - sexual production in intraspecific parasitism and, 10
  - social polymorphism in, 11, 15-16
- Solenopsis richteri*
  - hybridization and, 12
- Spatial models
  - gene flow estimation and, 113-14
- Specialization
  - extinction vulnerability and, 500-2
- Speciation
  - founder effect models of, 368
  - Haldane's rule and, 196
  - hybrid gene interactions in, 372-75
  - models for, 365-66
  - simulation studies of, 367-68
  - recombinational experimental verification of, 370-72
  - model for initial stages of, 363
- Species
  - abundance of biodiversity preservation and, 246
  - exotic riparian zones and, 639-40
  - hybrid defined, 360-61
  - homoploid, 381-83
  - natural, 376-81
  - postmating barriers and, 377-80
  - premating barriers and, 380-81
  - rarity of, 611
  - Species conservation conservation biology and, 244
  - Species formation hybridization and, 362
  - Species richness "character richness" and, 254-55
  - Species turnover, 467-87
  - Species vulnerability, 504-5
  - Sphaeraster*
    - evolution of generation of plating and, 234
  - Sphecius speciosus*
    - relatedness in, 8-9
  - Sphenodon*, 246-47
  - Sphenodon punctatus*, 250
  - Sporophytes, 397
  - Sprinkle, J. S., 96
  - Stanley, S. M., 134
  - Statistical sufficiency biodiversity and, 253-54
  - Stearns, S. C., 501
  - Stebbins, G. L., 365, 367, 371, 594, 597
  - Stephanomeria*
    - homoploid hybrid speciation in, 377
  - Stephanomeria diegensis*
    - hybrid speciation and, 377-79
  - Stewart, G. W., 142
  - Stewart, S. C., 64
  - Stick insects
    - hybrid sterility in, 199
  - Sticklebacks
    - male alternative reproductive behaviors in, 574, 582
  - Stock concept
    - conservation biology and, 256-57
  - Strathmann, R. R., 225, 231
  - Straw, R. M., 380
  - Streams
    - microclimate of riparian forests and, 631
    - riparian communities and, 623
    - wood debris in, 630-31
  - Stuart-Hill, G. C., 525
  - Subpopulation, 108
  - Subsociality
    - termite social evolution and, 33
  - Sundberg, F. A., 134
  - Supralittoral zones
    - detrivore populations in, 291-92

- Surrogacy  
   biodiversity and, 254–56  
 Swofford, D. L., 606  
 Swordtail  
   alternative reproductive  
     behaviors in, 580–81  
 Symbiont transfer hypothesis  
   termite social evolution and, 34  
 Sympatry  
   homoploid hybrid speciation  
     and, 369  
*Symphodus ocellatus*  
   male reproductive behaviors in,  
     571–72  
*Symphodus tinca*  
   female alternative reproductive  
     behaviors in, 577, 584  
 Symplesiomorphy, 376  
 Syngamy, 393, 406  
   incomplete, 407  
*Synomaloptilia*  
   mouthparts of, 159  
 Systematic biology  
   morphological diversity in,  
     129–30
- T**  
 Tabachnick, R. E., 135  
 Taborsky, M., 573  
 Taconic orogeny, 94–95  
*Tamarix*  
   riparian zones and, 640  
*Tamarix ramosissima*  
   floodplain invasion by, 644  
*Taxodium distichum*  
   seed dispersal and, 625–26, 632  
 Taxonomic diversification  
   morphological diversification  
     and, 136–37  
 Taxonomic diversity  
   horizontal transfer of genetic  
     variation and, 594  
 Taxonomic richness  
   biological diversity and, 130  
 Taxonomy, 250–53  
 Taylor, C. E., 280  
 Templeton, A. R., 365–66, 369,  
   597  
 Teramoto, E., 274  
 Terborgh, J., 497  
 Termites  
   biology of, 29–31  
   eusociality in, 27–49  
     correlates of, 39–43  
   termite ancestors and, 43–48  
   kin-based behavior in, 12  
   mandibulate condition in, 155  
   social evolution in  
     hypotheses on, 33–39
- worker  
     developmental/reproductive  
       options of, 31–33  
 Termopsids, 29–30  
 Terrestrial systems  
   nutrient flow in  
     hydrologic cycle and, 292  
*Thalassoma bifasciatum*  
   male alternative reproductive  
     behaviors in, 574  
 Thomas, R. D. K., 141–42  
 Thoren, P., 1–20  
 Thorne, B. L., 27–49  
 Thrips  
   haplodiploidy and, 56  
   haustellate-stylet condition in,  
     155  
 Thysanopterans  
   mouthcone mouthparts of, 176  
 Tiger beetles  
   endangered status of, 258  
 Tilman, D., 555  
 Time  
   gene flow estimation and,  
     122–23  
 Topology  
   tests of, 456–60  
 Torsvik, V., 259  
 Total population, 108  
 Trace fossils  
   in Upper Ordovician, 96  
*Tragelaphus scripta*  
   riparian zones and, 643  
*Tragelaphus strepsiceros*  
   riparian zones and, 643  
 Traits  
   extinction vulnerability and,  
     498–505  
   K-selection and, 272  
   measurement of diversity and,  
     132–33  
 Transition zones, 621  
 Tree-grass interactions, 517–37  
   models of, 531–36  
 Tree roots  
   herbaceous production and, 521  
 Tree-tree interactions, 526  
 Trembling aspen  
   riparian zones and, 643  
 Triassic  
   insect mouthparts in, 159–60  
*Tribolium*  
   population stability in  
     adult cannibalism and, 276  
*Trifolium repens*  
   local distribution of  
     fine-scale variation and,  
       557–58  
 Trilobite fauna  
   in Cambrian, 134  
   in Middle Ordovician, 96
- Triturus*  
   male heterogamety in, 199  
 Trivers, R. L., 3  
 Trophic structure, 467–87  
   compositional change and,  
     482–85  
   theories of, 469–71  
 True, J. R., 211, 213  
*Trypanosoma*  
   antigen-coding gene variation  
     in, 402  
*Trypanosoma brucei*  
   aneuploidy in, 400  
 Turbulent flow  
   particle delivery and, 324  
 Turelli, M., 208, 209  
 Tyree, M. T., 644
- U**  
*Ursus arctos*  
   riparian zones and, 643  
 Uyena, T., 604
- V**  
 Van Valkenburgh, B., 135  
 Vasi, F., 278  
 Vegetation dynamics  
   in riparian zones, 629  
 Vegetative reproduction, 393, 412,  
   416, 596  
   meiotic, 408  
*Velocirax*  
   mouthparts of, 162  
 Vermeij, G., 91, 92, 93  
*Veromessor pergandei*  
   pleometrotic associations of  
     queens in  
       relatedness in, 7  
 Vertebrates  
   parasite component  
     communities of  
       infracommunity richness in,  
       351  
*Vespa*  
   matings in, 6  
*Vespa rufa*  
   microsatellites in, 4  
 Volcanism  
   during Ordovician Radiation,  
     88–89  
 von Haeseler, A., 448
- W**  
 Wada, H., 224  
 Wagner, P. J., 136, 139, 140, 145,  
   146

- Waisfeld, B. G., 94  
 Walker, P. A., 260  
 Walter, H., 531-32  
 Warner, R. R., 571-89  
 Warthog  
   riparian zones and, 643  
 Wasps  
   annual colonies of, 2  
   cofoundresses in  
     relatedness of, 8  
   colony cycles in, 18  
   cyclical oligogyny in, 19  
   eusocial  
     cofoundresses in, 8  
   evolution of helpers in, 38  
   inbreeding in, 63  
   matings in, 6  
   microsatellite markers for, 4  
   relatedness in, 8  
   split sex ratios in  
     worker-manipulated, 15  
 Water  
   savannas and, 527-28  
   underground plant competition  
     and, 563  
 Water flow  
   biofilm type and, 332  
   chemical cue distribution and,  
     330-31  
   depressions and, 320-22  
   as forcing agent, 322-28  
   planar substrata and, 319  
   propagule settlement and,  
     317-36  
   protruding bodies and,  
     319-20  
   sediment load and, 331-32  
   as settlement cue, 328-29  
   soft-substratum type and,  
     332  
 Water masses  
   organic biomass in, 291  
 Water tupelo  
   seed dispersal and, 625-26  
 Webster, M. S., 668, 676  
 Weedy taxa  
   spread of, 512-13  
 Weiner, J., 561  
*Weinmannia racemosa*  
   flooding and, 639  
 Weir, B. S., 110, 111  
 Weitzman, M. L., 260  
 Werren, J. H., 68  
 Westoby, M., 532  
 Wheeler, Q. D., 251  
 White, M. J. D., 599, 601,  
   604  
 White-tailed deer  
   riparian zones and, 642  
 Whitt, G. S., 604  
 Williams, P. H., 252, 254  
 Williamson, D. I., 225-26  
 Willis, E. O., 500  
 Wills, M. A., 139  
 Wilson, E. O., 244, 245, 246, 270,  
   271-72, 344, 500  
 Wilson, I., 122  
 Wilson, J. B., 559  
 Winge, 362  
 Wood  
   in streams and riparian zones,  
     630-31  
 Wood ants  
   population structures in,  
     16-18  
 Wood turtles  
   habitat of, 642  
 Woody plant-grass interactions  
   studies of, 519-27  
 Woody plants  
   effect of grasses on, 524-26  
   effects on grasses, 519-24  
   modification of environment by,  
     527-30  
   nutrient accumulation below,  
     528-29  
 Wray, G. A., 225, 227, 229,  
   230  
 Wright, S., 106, 108, 110,  
   112  
 Wu, C.-I., 206, 209, 210,  
   212, 213  
**X**  
 Xanthophytes  
   amphimixis and, 404  
*Xiphophorus nigrensis*  
   alternative reproductive  
     behaviors in, 580-81  
 X-linked genes  
   autosomal genes compared,  
     74-76  
   effective population size and,  
     61-63  
   haplodiploids and, 55-77  
   inbreeding and, 63-65  
   inbreeding depression in,  
     67-70  
*Xyloplax*  
   derivation from asteroids, 235  
**Y**  
 Yang, Z., 448, 449  
**Z**  
*Zauschneria*  
   early hybrid generations of  
     viability and fertility of, 369  
 Zeng, Z.-B., 677  
 Zoochory, 626  
 Zooplankton response factor  
   (ZRF), 477, 479  
*Zootermopsis*  
   wing bud abscission in, 38  
*Zootermopsis angusticollis*  
   neotenic reproductives in, 30  
   soldiers in, 30  
 Zouros, E., 202  
 Zygobionts, 397, 403, 420  
 Zygote, 393